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Summary and Interrelation Chart of Factors Affecting the Performance of Bituminous Paving Mixtures

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16. ABSTRACT

This report addresses significant properties of bituminous paving mixtures, stability, resistance to water action, resistance to cracking, etc., surface texture, permeability, abrasion resistance, flexibility; Less significant properties Particle surface texture, wettability, particle gradation, porosity of the stone particles, less significant properties hardness, specific gravity, particle shape and color; Significant properties of asphalt consistency, rate of setting, adhesive ability, durability; Less significant properties, color, smell, solubility, and ductility

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SUMMARY

AND

INTERRELATION CHART

OF

FACTORS AFFECTING THE PERFORMANCE OF BITUMINOUS PAVING MIXTURES

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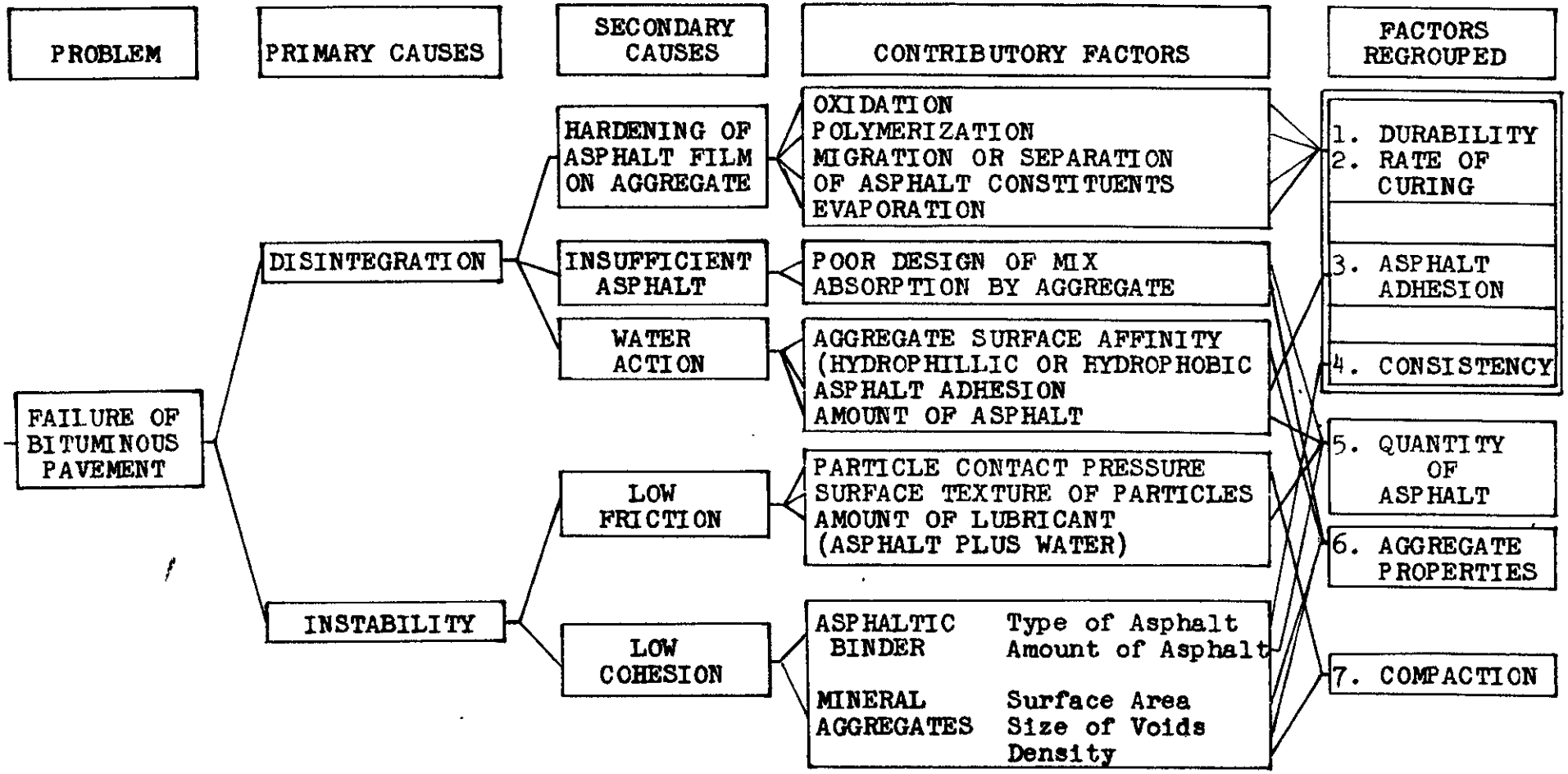

SIGNIFICANT PROPERTIES OF BITUMINOUS PAVING MIXTURES

STABILITY = Resistance of the pavement to deformation

Two variable properties or elements combine to produce stability

1. Friction (Between Solid Particles)
   Measured by the Stabilometer

2. Cohesion of the Asphalt Films = Tensile or Flexural Strength of the Pavement
   Measured by Cohesiometer Test

RESISTANCE TO WATER ACTION = Preferential Wetting (Hydrophilic or Hydrophobic agg. etc.)

Depends on Adhesive Ability of Asphalt & Wettability of Aggregate

Measured by - Swell Test, Stripping Test, Moisture Vapor Test & Immersion Compression Test.

RESISTANCE TO CRACKING, ETC. = Generally Depends on Degree of Brittleness of Asphalt Binder

SURFACE TEXTURE = Non-Skid or Slippery

PERMEABILITY = Porosity of Pavement

Depends on pore size and contact angle at interface (Water, Air, Asphalt)

Measured by Permeability Test (Swell Test)

ABRASION RESISTANCE = Ravelling or Pitting, usually due to lack of Asphalt

Related to Cohesion or Tensile Strength

FLEXIBILITY = Varies with Aggregate Gradation, Amount and Type of Asphalt, Thickness of Slab and Temperature

LESS SIGNIFICANT PROPERTIES

Hardness of Pavement, Color and Compressive Strength

SIGNIFICANT PROPERTIES OF AGGREGATES

PARTICLE SURFACE TEXTURE = As it affects (1) Stability
(2) Oil Content Required

Measured by - Stabilometer Test

WETTABILITY = Free Surface Energy or Adsorption Preference

Indicated by - Swell Test, Stripping Test, Asphalt Preferential Test, Moisture Vapor Test

PARTICLE GRADATION = Grading Analysis

Measured by - Sieve Analysis, Hydrometer Sedimentation

POROSITY OF THE STONE PARTICLES = Indicated by Centrifuge Kerosene Equivalent

LESS SIGNIFICANT PROPERTIES

Hardness, Specific Gravity, Particle Shape and Color

SIGNIFICANT PROPERTIES OF ASPHALT

CONSISTENCY = Viscosity or Fluidity

Measured by - Penetration, Float, Saybolt Furol Viscosity

RATE OF SETTING = Rate of Curing, Rate of Evaporation or Volatility, Oxidation

Measured by - Cohesiograph, Loss on Heating, Distillation, % of 100 Pen. Residue

ADHESIVE ABILITY = Free Surface Energy, Preferential Adsorption

Measured by - Swell Test, Stripping Test, Moisture Vapor Test

DURABILITY = Ability to Retain Original Properties

Measured by - Abrasion and Impact after Weathering or Exposure to Heat (Radiant Energy) and Moisture

LESS SIGNIFICANT PROPERTIES

Color, Smell, Solubility and Ductility

CONTINUOUS RECORD OF PLANT CONTROL TESTS

CONTRACT 07 V C 14

VII - LA - 60 - LA

100 % Passing 1¼" Sieve - Lab. and Field

—— Field Results

- - - - Lab. Results